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A GENERAL REVIEW OF U. S. FOREST SERVICE
TIMBER APPRAISAL POLICIES AND PROCEDURES

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Report of the

TIMBER APPRAISAL REVIEW COMMITTEE

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June 1, 1963

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A GENERAL REVIEW OF U. S. FOREST SERVICE TIMBER APPRAISAL

POLICIES AND PROCEDURES

INTRODUCTION

The Timber Appraisal Review Committee was established by the U.S. Forest Service at the direction of the Secretary of Agriculture on December 19, 1962 to investigate and report upon the appraisal policies and procedures employed by the Forest Service in its timber sales program. Its members are Albert C. Worrell, Chairman, Professor of Forest Economics, Yale University, New Haven, Connecticut; A. N. Lockwood, independent real estate broker and appraiser and Past President of the American Institute of Real Estate Appraisers, Newton, New Jersey; and M. J. Lauridsen, Valuation Engineer, Internal Revenue Service, Portland, Oregon.

In its instructions, the Forest Service granted the Committee absolute autonomy, directing it to conduct the review in any practical manner deemed necessary by its members. The expressed desire was to permit the Committee freedom to submit a report lacking in bias. The Forest Service files, with one restriction, were made available to the Committee at all levels of operation, the sole restriction relating to confidential cost and selling value data furnished to the Forest Service by timber purchasers. The Committee was authorized to perform prudent travel throughout continental United States and Canada during the course of the review.

The formation of the Committee was prompted by collective charges by the wood-using industry that the timber management policies of the Forest Service had created instability within that industry. These charges were directed not only at the over-all timber management policy but also at specific aspects of that policy.

Included among the phases of management given special attention by industry were timber appraisal policies and procedures. It was charged that the appraisal policies and procedures of the Forest Service are vague, unpredictable, inequitable, and, in the light of the growing dependence of the industry upon the national forests as a source of raw material, have been detrimental to the stability of the industry. It was also charged by industry that a 15-year period of negotiations with the Forest Service has resulted in slight progress and that there has been a general lack of objectivity in the negotiations.

The Forest Service, on the other hand, while recognizing that the appraisal of timber in localities where demand is far in excess of available supply is difficult, complicated, and controversial, has summarily rejected some of the industry's charges of flagrant inequities in the appraisal system.

Cognizant of the need to continue to refine and improve its appraisal procedure, and disturbed by the charges of industry, the Forest Service authorized the Committee to review all of its timber appraisal

policies and procedures and to recommend means of eliminating non-productive controversies and of improving, within legal and practical bounds, the procedures employed.

With the above objective in mind, the Committee conducted private interviews with knowledgeable persons directly or indirectly concerned with the sale or purchase of timber, both public and private. Where personal interviews were impractical, written comments or statements were solicited. The basic purpose of the interviews was to seek first-hand information within the scope of the problem area. This included, but was not limited to, the appraisal policies and procedures now employed by both private and public timber sellers, the full basis for the criticism leveled at the Forest Service appraisal system, and recommendations for possible improvements in both policy and procedure.

To assure purchasers of Forest Service timber and other interested parties an adequate opportunity to present their views or comments, wide publicity was given to the Committee's formation, purpose and contemplated itinerary. The wholehearted cooperation of the Forest Service and of various industry associations in this respect and in arranging personal interviews with knowledgeable individuals was of invaluable assistance to the Committee. We feel that a reasonable cross-section of views was obtained, including those of representatives from very small to very large interests.

Among those privately interviewed were personnel from all levels of Forest Service management, including field men performing the initial tasks of timber sale layout. To obtain the views of personnel in other agencies responsible for selling public timber, the Committee consulted individuals from the Bureau of Land Management, the Bureau of Indian Affairs, the British Columbia Forest Service, and several western state governments. Personnel of the General Accounting Office and the Staff of the Senate Committee on Interior and Insular Affairs were also interviewed.

The views of industry were obtained through private consultation with representatives of the major industry associations and with numerous purchasers of National Forest timber or their representatives, and through documents or written statements submitted by industry spokesmen. Interviews were also held with, or statements submitted by, informed consulting foresters as representatives of private timber sellers or upon their own behalf.

The Committee studied all available printed material on the subject of timber appraisals including earlier Congressional studies and reports, reviews of the issue by independent writers, and historical summaries of the controversy in an attempt to fully grasp the significance of the problem.

Basically, industry contends that present Forest Service timber appraisal policies and procedures are resulting in instability in an industry that has become substantially dependent upon the federal government for its timber supply. It is true that wood-using industries in some areas of the country are becoming more dependent on the national forests as a source of raw material. This is particularly so in the

West where a dramatic imbalance between the installed plant capacity and the amount of timber available from other sources has exerted added pressure upon the national forests. It is less the case in other regions where plant capacity and available private timber are more in balance.

Demands upon the national forests of the West will undoubtedly increase in the future as the present reserves of privately-held old-growth timber diminish through cutting. Many large private western owners are trying to re-establish a normal growing stock on their clear-cut or selectively-cut lands, but a high percentage of the privately-owned commercial forest land is held by small owners and is not under adequate management. This will probably lead to a hiatus in production from private western lands and tend to shift more of the demand onto the national forests for a period of years. Consequently, the matter of dependence of the wood-using industry on the national forests, at least in the West, will likely be even more significant in years to come.

The relationship between the national forests and the wood-using industry is in some respects unique. It cannot be characterized as a one-way street with all benefits flowing in one direction. There is a mutual interdependence that cannot be ignored since the sound management of the national-forest timber resource depends to a large degree upon the wood-using industry. This is indirectly recognized in the Forest Service Manual which says regarding commercial timber sales: "This is the form of use which involves by far the greatest volume of timber. It furnishes opportunity for accomplishing the major purposes of national forest administration, such as maintaining and improving the forest and the productive capacity of the land." (FSM 2411.51)

The primary product sold by the national forests is standing timber and this will undoubtedly be true in the future despite a suggestion from one source that the federal government resolve its appraisal problems by producing and selling logs at the market place. It is through its timber sales program and through the purchases of timber by industry that the Forest Service is attempting to achieve a sustained timber yield on the lands it administers. The timber sales program also annually recovers a substantial monetary value that would otherwise be lost to decadence, disease, insects, and windthrow. This recovery could not be realized without a relatively stable wood-using industry. Furthermore, the timber sales program has contributed substantially to the construction of the present access road system that is necessary for protection, multiple-use, and over-all forest management. Industry is an essential element in this development. These factors emphasize the mutual interdependence which exists between the national forests and the wood-using industry. Neither can effectively achieve its goals independently of the other.

The Basic Objective of the Timber Appraisal

An analysis of basic directives and regulations governing the appraisal of commercial timber sales on the national forests is prerequisite to a full understanding of the issues involved. These reveal the objectives of the Forest Service in its timber pricing policies and will be discussed briefly.

The Forest Service Handbook states:

"Market value as used by the Forest Service in stumpage appraisals is the price acceptable to a willing buyer and seller, both with knowledge of the relevant facts and not under compulsion to deal. This price is sometimes called 'fair market value'..." (FSH 2423.12)

This definition of market value is generally accepted by the appraising profession as accurate and adequate. However, it must be recognized that it infers a basic date to which the appraisal must be related. In the case of a Forest Service timber sale, it is logical that this date be that of the sale rather than the period over which it is expected that the timber will be cut and removed although it is clear that the period of cutting will influence the current market value because of the assumption of market risk by the purchaser.

The Handbook further says: "...The act of June 4, 1897, provides that national forest timber may be sold at 'not less than the appraised value'. In applying this requirement the aim in national forest stumpage appraisals is to determine market value. Thus appraised value and market value as used by the Forest Service mean the same." (FSH 2423.12)

The meaning of the term "appraised value" as used in this act was the subject of a written opinion by the Assistant General Counsel of the Department of Agriculture on May 3, 1962. The opinion stated that "appraised value" as used in the statute is to be given its generally accepted meaning and is synonymous with "market value" or "fair market value" which supports the interpretation used by the Forest Service in FSH 2423.12.

The Counsel cited as his authorities a definition given in a legal dictionary, a 1926 opinion by the Solicitor of the Department of Agriculture, and a departmental interpretation based upon the doctrine of executive construction. The opinion has been attacked by industry on two counts; first, that the doctrine of administrative construction is a weak reed and, second, that changes in conditions over the years have altered the basis for the objective of market value.

It must be recognized that appraisals can be made with various objectives in mind and that the resulting estimate of value will be related to the objective. The portion quoted above from the Forest Service Handbook would indicate that the objective of a Forest Service timber appraisal is the determination of fair market value.

The following statement is also found in the Handbook:

"...Determination of appraised value (market value) by the Forest Service is based to a large extent upon the costs and returns applicable to representative forest-product operations of average efficiency..." (FSH 2423.12)

At this point, fair market value becomes qualified to that applicable to representative forest product operations of average efficiency. This qualification is reiterated and further expanded at the end of FSH 2423.12, which states:

"...the appraised value is based on the operator of average efficiency and is aimed at a market value which will interest sufficient purchasers to harvest the allowable annual cut offered for sale."

The usage of "market value" is further qualified in FSH 2423.13, as follows:

"The dividing mechanism, (profit ratio or other methods)...., can be expected to produce a profit margin and residual stumpage which will fill two criteria.

- "1. A profit margin sufficient to maintain operations over the long run.
2. An appraised stumpage equal to current market value considering lumber market trends."

Thus, the generally accepted definition of fair market value has become clouded with qualifications and tends to lose real meaning. Instead of seeking fair market value in the ordinary sense, the qualifications imposed by the Handbook result in a hybrid value in the guise of market value. This, we believe, leads to complications and controversies that could well be avoided.

While the concept of an operator of average efficiency is highly hypothetical, it is, nevertheless, a logical basis for the appraisal approach. Because of the mutual interdependence of all data used in the appraisal process, a true and definite relationship must exist between them and this must be within the framework of the average operator. This is admittedly a complex determination but any imbalance between selling values and costs will tend to distort the conversion return, and ultimately, the profit margin and the appraised stumpage value. Each factor must, therefore, retain a true and identifiable relationship with all other factors in the appraisal and must be applicable to the operator of average efficiency. This interdependence is recognized in Chapter 2400 of the Forest Service Handbook but the Committee found that it was not, in fact, considered in all appraisals.

A problem of major importance in the appraisal lies in dividing the conversion return which is estimated on the basis of an operator of average efficiency into its two components: a profit margin sufficient to maintain operations over the long run, and an appraised stumpage equal to current market value considering lumber market trends. The profit ratio employed for this purpose is stated to be determined "by application of factors developed from historical bidding experience adjusted upward or downward by judgment to reflect the influence of market trends, possible bias in appraisal data, extent of competition, availability of timber to established mill capacity and range of operator efficiency." (FSH 2423.27). "The objective in profit ratio

determination is to arrive at the ratio that will fit the appraisal data used and reflect profit margins applicable to the operator of average efficiency." (FSH 2423.64)

As possible, but by no means controlling, guides to the judgment adjustments of the profit ratio, FSH 2423.64 suggests the use of an analysis of current bidding experience. The analysis may be in several forms, including bidding indices and substitution, but its intent is to determine the relationship between appraised value and bidding results. In an attempt to eliminate possible bias from extraneous factors, the Handbook prescribes reliance upon median bids in this analysis. In addition, the analysis must give consideration to "no bid" sales.

Whether this or any other form of bidding analysis can be directly related to a profit margin sufficient to maintain an operation of average efficiency over the long run is still a matter of judgment. This is further complicated by the fact that this profit margin must also allow for "an appraised stumpage equal to current market value considering lumber market trends." In highly competitive areas, bid prices -- or even median bid prices -- may cause the experienced profit ratios to be wholly inadequate to maintain an operator of average efficiency over the long run. Yet these bid prices, taken at face value, possibly do indicate that current market values for timber are at a relatively high over-all level. The momentary conditions of the market may produce relatively wide fluctuations over time and cause significant movements in the level of market values. While an operator of average efficiency might be able to satisfactorily weather a limited period in which the level of market value was relatively high, he possibly could not survive under such prices over the long run.

The problem, as the Committee views it, is one of determining the level of profit that will sustain operations of average efficiency over the long run rather than attempting to relate appraised stumpage values directly to current fair market value. This, we believe, will fulfill the primary long-range objectives of the Forest Service and will tend to eliminate a significant area of controversy with industry.

Industry has bitterly protested the use of transaction evidence in any form in the adjustment of the profit ratios used in the appraisal of national forest timber. The protest is generally based on the grounds that national forest sales are consummated in an abnormal market due to the dominant position of the Forest Service as a timber seller. Industry spokesmen contend that this disqualifies the use of bid prices for Forest Service timber as transaction evidence in determining fair market value because the purchasers cannot be characterized as "willing buyers not under compulsion". Allusions to this alleged situation have been freely made in Congressional committee hearings and in the trade literature. If these statements are well-founded, it must equally be true that the prices bid for Forest Service timber should be disqualified as admissible evidence in any case where the desired objective is to find fair market value.

While the Forest Service Handbook does suggest the use of transaction evidence as one of the several guides in determining a possible need for adjusting the profit ratio, the Committee found that its use, during recent periods, has had but minor influence on the profit ratio. Industry charges of reliance by the Forest Service on transaction evidence seem to be unduly inflated in the light of the facts.

The Appraisal Procedure and Industry Criticism

The appraisal procedure treats stumpage value as a residual by deducting estimated costs and an allowance for profit and risk from estimated selling values. While simple in principle, this procedure is quite complicated in application.

Industry is in general agreement that the basic procedure is sound but contends that it is overly complex and is subject to many errors arising from uninformed judgment. Hence, it lends itself to inconsistencies.

The appraisal procedure actually commences in the forest where basic information must be determined about the timber to be offered for sale. The critical data needed on each individual species to be designated for cutting includes accurate estimates of volume, quality, log size, amount and character of defect, possible extent of breakage in logging, and other factors. This information is of utmost importance in the appraisal since any errors made at this point of the procedure are cumulatively carried throughout the entire process.

Industry contends that much of the difficulty in the appraisal process originates at this point, primarily because the personnel making the field investigations lack experience. It is claimed that the Forest Service policy of transfer and promotion precludes the development of experienced personnel at this level of field work and results in inaccurate estimates of the net merchantable volume, erroneous representations as to log grades or timber quality, and other information of questionable reliability. This situation is said to produce inconsistent appraised values on tracts that are reasonably comparable in other respects.

Related to the above criticism is the contention that marking for selective cutting is also inconsistent and subject to the whims of the inexperienced timber marker rather than following closely the marking rule designated for the sale.

The appraisal procedure further provides that net estimated end-product selling values be determined at the point of appraisal and be converted to a log scale basis by overrun or underrun factors to equate them to the scale used for determining stumpage payment. This phase of the appraisal procedure involving estimated grade recoveries, selling values, and overruns was the subject of numerous criticisms from industry. The most frequent of these were:

1. Regional or zonal lumber grade recoveries employed in the appraisals are not realistic for local areas and adversely affect the estimated selling values.

2. Cash discounts and commissions and the cost of lumber haul from mill to rail-head or market should not be deducted from gross selling value.

3. Overrun and underrun factors employed in appraisals are not consistent with actual experience.

4. Scaling practices by inexperienced personnel generally result in excessive scale quantities, adversely affecting ultimate stumpage payments, sawmill overrun, and estimated end product selling value when converted to a log scale basis.

The appraisal procedure further provides that the costs of logging from stump to truck be determined upon the basis of regional or zonal averages, subject to adjustment for variables peculiar to the sale area and local conditions. Only minor criticism was received from industry with respect to this phase. However, it was indicated that there is a tendency among Forest Service appraisal personnel to use simple regional or zone-average costs without recognizing the conditions peculiar to the sale. It was further claimed that contractor's profit should be included as an appraisal cost where any portion of the logging phase is performed by a contractor.

The log transportation costs employed in the appraisal must reflect length of haul, road standards and conditions, log size, and degree of log defect. These costs are generally determined upon the basis of the results of an administrative study. Here, again, there was only minor criticism from industry although they did express the belief that the Forest Service estimates of transportation costs are ultra-conservative.

Main and secondary road costs, as used in the appraisal, are estimated by Forest Service engineering personnel through study of the proposed timber sale layout and the application of average costs per unit of classified material or work to be done. Road costs are a major source of criticism from industry. While the charges are numerous, the following are those deemed to be most important:

1. Experienced road cost is often in excess of that allowed in the appraisal. This, it is claimed, results from various factors including poor layout; inexperienced engineering personnel; improper classification of material to be moved; overly rigid requirements for horizontal and vertical alignment; improper location and size of culverts; excessive grade, ditching, surfacing, and right-of-way clearing requirements; and other related issues.

2. There is a conflict between the "prudent operator" concept and multiple-purpose road requirements. Industry, in general, contends that the difference in cost between a prudent operator road and a multiple-purpose road should be borne by the government when the additional cost does not allow a normal profit opportunity to the purchaser.

3. Contractor's profit, where it is an industry practice to contract road construction, should be allowed as a cost in the appraisal.

4. The risks involved in the uncertainties of road construction should be fully recognized in the margin for profit and risk.

5. Additional efforts should be made by the Forest Service to relate the size of timber sale to road requirements in order to assure a normal profit opportunity in the appraisal.

Manufacturing and selling costs, as employed in the appraisal and where applicable, are based upon regional or zonal averages adjusted for variations in species, log diameters and length, and other factors. These costs are translated onto a log scale basis to maintain a consistent unit of measure. In general, industry had little criticism of the costs used for manufacturing, with the exception of the treatment of cash discounts and commissions as mentioned above.

Up to this point, the appraisal is concerned with estimated and product selling values and anticipated costs of producing the salable product. When costs are deducted from selling values, the results is the conversion return which must be divided into its two component parts: the margin for profit and risk and stumpage value. In this dividing process, the Forest Service uses a profit ratio that is intended to produce a margin for profit and risk that will maintain the industry over the long run and a stumpage value that is consistent with current market value considering lumber market trends.

Industry does not indicate objection to the profit ratio approach to the division of the conversion return. Instead, their objections concern the amount of the conversion return that is allocated to profit and risk, considering the questionable reliability of the selling values and costs included in the appraisal. A significant number of the industry representatives indicated that profit ratios in the approximate range of those now being used would be acceptable if the basic elements of the appraisal were reliable. They further felt that when unreliable data are used in the computation of the conversion return, an increase of the profit ratios now employed by the Forest Service would be warranted to give full consideration to the risks involved in acquiring a timber sale.

Each of the items mentioned above will be discussed in detail later in this report.

THE KEY PROBLEMS

Certain problem areas stand out from those just mentioned and we feel that definite changes in Forest Service policy and procedure are needed to deal with them. Basically, the method which has been developed over the years for appraising national forest timber is satisfactory, although unduly complicated, and we cannot suggest a radically different and better method. What we do believe is that important modifications should be made in the existing framework.

The Objectives of Selling National Forest Timber

A fundamental difficulty in appraising national forest timber is the lack of a clear statement of the objective which the Forest Service has in selling this timber. The Forest Service Manual states that "The basic objective of the Forest Service is to exercise progressive national leadership in forestry, including dynamic administration of the national forests. This objective embraces the entire field of forestry and its contribution to human welfare." One of the components of this objective is stated to be: "Making all resources of national-forest lands ...as fully productive and of as great service... as necessary for them to supply their share of national requirements in an economy of abundance." (FSM 1031)

If the national forests are to supply their share of the nation's wood requirements, the timber they produce must be harvested and processed, since these requirements are for wood products and not for standing trees. But in the United States, logging and the manufacture of wood products have traditionally been carried out by private enterprise. The public timber must therefore be sold to private operators before it can make its contribution to national requirements. The Forest Service was authorized to sell national-forest timber by the Act of June 4, 1897, which provided that the Secretary of Agriculture might sell trees from the national forests "for the purpose of preserving the living and growing timber and promoting the younger growth..." (FSM 2401). This was a very limited purpose and it was broadened in 1948 by the then Secretary of Agriculture who authorized the Chief of the Forest Service "to permit the use of the timber resources of the National Forests...so as to make that resource of the greatest permanent usefulness to the people of the United States." (FSM 2403)

None of the written policy statements to date have spelled out the mutual interdependence of the national forests and the industry which uses the wood from those forests. Recognition is given in many places to the fact that the administration of the national forests could be beneficial or detrimental to the industry dependent on public timber. But the statements always read as though the Forest Service could manage the national forests independently of the wood-using industry if it were not for a moral obligation to consider the effects of their management on that industry. In reality, the Forest Service is completely dependent on industry as the medium through which it must channel timber from the national forests in order to "supply their share of national requirements."

The Forest Service thus has a very large stake in the maintenance of a healthy and progressive timber industry. It cannot rationally act as though it were independent of that industry. Furthermore, the national forests are a major segment of the wood supply for the United States. In the long run our country may have to depend on them for as much as 25 percent of the wood we use. The Forest Service cannot logically act as if it were a small timberland owner whose annual sales are of no significance in the overall wood economy. It would indeed be disastrous for the Forest Service to assume a take-it-or-leave-it attitude in its timber-sales program.

Fortunately the personnel of the Forest Service, and especially those responsible for timber management on the national forests, are fully aware of all of the above. The Forest Service does not usually act as if it were independent of the timber industry, and its officials show great concern over this relationship. But the fact that there is no clearly stated policy about the mutual interdependence between the national forests and the timber industry shows up in uncertainties about the objectives of timber appraisal and in a lack of compatibility among certain parts of the present appraisal process. In the following section, we will suggest a modification of the appraisal system which we feel will make it more realistic in this respect. But independently of this, we urge that the Forest Service, after careful study, prepare and publish a firm statement of policy regarding the purpose of national forest timber sales.

The Attempt to Appraise to Fair Market Value

The problem of appraising national forest timber is complicated by a stated objective of determining the "market value" or "fair market value" of the timber accompanied by a stipulation that the data to be used in the analysis be those "applicable to representative forest-product operations of average efficiency". The basic theory is that the stumpage price is the residual which remains after the costs which would be experienced by an "operator of average efficiency" and a profit and risk margin sufficient to maintain operations over the long run are subtracted from the selling values which would be realized by such an operator of average efficiency. In actual practice, the margin for profit and risk is a variable which is adjusted with the aim of obtaining "an appraised stumpage equal to current market value considering lumber market trends."

Since the actual prices paid in the market are set by the buyers who happen to be in the market at the particular time and not by the operator of average efficiency, it would only be in exceptional cases that the present appraisal procedure would produce an appraised price equal to what the timber would actually sell for. If a profit and risk margin suitable for an operator of average efficiency is used, the appraised price will often be lower than the price that the timber will bring. However, if an effort is made to adjust the profit and risk margin so that the residual approach produces stumpage value equal to the selling prices obtained where bidding went above the appraised value, the resulting margin for profit and risk will be too low to maintain an average operation over the long run.

It appears to the Committee that the Forest Service cannot escape from this dilemma so long as it tries to obtain an appraised value equal to market value by using a residual approach based on operator-of-average-efficiency data. We do feel, however, that some modifications in the present approach would produce a workable and justifiable procedure.

The objective of the appraisal process should be to determine an "acceptable" price for national forest timber. This is the least that the government should accept in view of the dual interests of the public in receiving a just price for its property and in maintaining a healthy and efficient wood-using industry over the long run.

The selling price of the timber should be ascertained by offering it for sale under competitive bids as is now being done. The appraised price should serve merely as an upset price or floor below which bids will not be accepted. It will be equal to selling price only in those cases where someone is willing to buy at the upset price but no one will pay more.

Since the preparation and administration of national forest timber sales require the expenditure of public money and since the maintenance of forests in an uncut condition provides intrinsic values, national forest timber should only be sold when it will yield some minimum amount of revenue. (Forest Service policy has always recognized that special circumstances may justify giving away limited amounts of timber.) It appears to the Committee that the \$1.00, \$2.00, and \$3.00 minimum prices for different species described in Section 2430.71 of the Forest Service Handbook are reasonable and satisfactory for this purpose and should not be changed.

Except where the floors set by the minimum prices prevent the acceptable price of individual species from going lower, the appraised price should be calculated by the residual approach, using selling values and costs of an operator of average efficiency and a margin for profit and risk suitable for this same operator. The appraised price would, therefore, be a true residual. A uniform allowance for profit should be included in all appraisals and the allowance for risk should be varied to conform to the particular risk conditions of each sale, as described later in this report.

The acceptable price for the entire tract should be determined on a "sale-as-a-whole" basis. If the residual approach produces a stumpage price lower than the minimum for a certain species, enough of the costs charged against that species should be transferred and distributed proportionately against the other species in the tract to raise the residual stumpage for that species to the minimum price. In no case should this adjustment be made by lowering the margin for profit and risk.

If the cost of road development is charged against the whole sale as proposed in a later section of this report, it should not be necessary to raise the residual for stumpage so it will not be lower than the minimum price in many cases.

Under this approach, the actual stumpage price will be determined by competition among buyers in the market, as it now is in most sales. The appraised price will set a minimum below which the Forest Service will not sell and thus will actually determine the selling price when only a single buyer appears and is without competition. Since this appraised price is the maximum that an operator of average efficiency

could be expected to pay when not under compulsion, it will be a "fair" price for the government in those situations where the buyers are not compelled by competition to offer more.

The Forest Service should encourage and develop competition among the buyers of national forest timber in order that the market may carry out its function of determining the selling price. This may consist of varying the size of the sale, the length of the sale period, the timing of offerings, and similar actions but should not include withholding timber from sale because of lack of competition.

If the data going into the residual calculation are accurate for average-efficiency firms, there may be sales on which no potential buyer will pay the appraised price. When such a situation develops, the entire appraisal must be reviewed to make sure that every figure used is reasonable. Changes in the size of sale, percent of stand marked, and other possible ways of making the sale more attractive should also be considered. If such a review does not change the appraised price, the Forest Service must decide whether there are reasons why it would be in the public interest to sell this timber at a lower price. If such reasons exist, the price should be reduced just enough to attract a buyer. Otherwise the timber should be withheld until some later date.

The Handling of Development Road Costs in the Appraisal

The sale of national forest timber is complicated by the fact that a complete network of roads does not yet exist on most of these forests. In order to harvest the allowable annual cut, it is usually necessary to construct not only the temporary spur roads for timber removal but also extensions of the permanent utilization road system. Congress has never seen fit to appropriate sufficient funds to enable the Forest Service to build all the additional utilization roads needed to remove the annual cut, although appropriations have increased in recent years. The Forest Service has, therefore, been forced to pay for road construction out of stumpage receipts by including the construction of the necessary utilization roads in the timber sale contract.

The inclusion of access road construction in the sale agreement has complicated the stumpage appraisal tremendously. There are often expensive roads to build and call for substantial investment on the part of the timber purchasers. The operator can only recover this money through amortization against the stumpage as he cuts and pays for it. Many kinds of inequities have turned up and the Forest Service has made a series of efforts to correct or avoid them by modifying the way that road costs are handled in the appraisal process. This has produced a more complicated appraisal procedure, has led to confusion, and has developed additional problems in other parts of the appraisal process.

The obvious solution would be for Congress to appropriate sufficient funds each year for the Forest Service itself to construct the main access roads needed to harvest that year's allowable cut. This has been recommended many times before and has received the backing of the timber industry and other interested groups, but has yet to become

a reality. As an alternative, the Committee recommends a change in the appraisal procedure which we feel would simplify the process and avoid some of the inequities and confusion now possible.

We suggest that the timber be appraised as if the main access roads have already been constructed. The cost of temporary spur roads should be included along with other logging costs, of which they are a logical part. The cost of the main access roads should be omitted when calculating the conversion return for the individual species by the residual approach. A profit and risk margin, calculated as a percentage of the sales-realization value, should then be subtracted for each species to obtain its per-unit stumpage price as if the access roads were in place. If necessary, at this point costs should be transferred to other species so that all come out with a unit price at least equal to the minimum and with a full normal allowance for profit and risk.

The per-unit stumpage prices for the various species should then be multiplied by their estimated volumes to obtain a stumpage value for the entire tract. The total cost of constructing the needed access roads should be carefully estimated and subtracted from the stumpage value calculated for the tract. The result will be the appraised price for the tract on a sale-as-a-whole basis. When this timber is offered for sale, bidding should be on the basis of the prices calculated for the species as if the access roads were in place. Bidders should be notified that they will be required to build the access roads specified in the contract but will be given credit against stumpage payments for the estimated cost of building these roads. At the time of the sale, the buyers may bid higher on the per-unit stumpage prices of individual species -- as they now can -- and thus raise their total bid on the entire offering, if they so desire.

The first purpose of this suggested change is to clearly separate the cost of permanent road development from the direct costs of logging the timber. The cost of these roads should equitably be borne by the landowner since they remain a permanent part of the property. (The Forest Service recognizes this implicitly in the present appraisal procedure.) If the stumpage value of the timber is not sufficient to pay for the permanent development roads, the deficit should certainly not be charged against the buyer of the timber. The construction of these roads is an investment which will pay future returns to the public through the management of the national forests. The public should make this investment and if the existing timber value will not cover it, the Forest Service should make up the difference from other public funds. In such a case, the concept of a minimum price for stumpage is meaningless. If the appraised price of the total stand should work out to zero after the cost of the access roads has been subtracted, the Forest Service would not be giving the timber away -- it would be exchanging it for some specific amount of permanent access road. Whether the Forest Service considers this road to be worth the full value of the existing timber -- and perhaps a cash supplement besides -- is an administrative problem and not an appraisal problem. If it does not consider the proposed road to have that value, the timber should not be put up for sale. The buyer should not be forced to donate his services as a road contractor in order to qualify for the purchase of public timber.

The second purpose of the proposed change is to simplify the accounting for road construction costs. In the present appraisal process, the cost of access road construction is amortized by allocating this cost among the estimated volumes of the several species on the tract and adding the resulting per-unit cost to the other costs when calculating the stumpage residual. This method depends heavily on the accuracy of the volume estimate because if the actual cut falls below that estimated, all of the road cost will not be amortized. Since the Forest Service specifically does not guarantee the advertised volumes on timber sales, the full burden of a failure to completely amortize the road cost falls on the buyer. In recognition of this, the Forest Service has in many appraisals amortized the road cost over some portion -- commonly 80 percent -- of the estimated volume. This is called "accelerated amortization". It is mainly a device for assuring the buyer of an opportunity to amortize the full road cost even if the Forest Service has over-estimated the volume.

In some cases, the buyer must invest his money in road construction quite some time before he actually is able to start removing logs from the sale area. Due to seasonal conditions, a western operator may, for example, have to build the roads one summer and log out the timber the following summer. Some allowance for interest costs on such advance investment is sometimes attempted through an adjustment of the profit margin. The Forest Service has also tried to partly meet this problem by allowing what is called "rapid accelerated amortization" of the costs of certain main roads if the operator requests it.

Under the procedure proposed by the Committee, the road costs would not be entered in the residual appraisal computation but would be deducted as a lump sum from the total residual value of the timber. We recommend that the successful buyer then be given full credit for the estimated road investment against the stumpage price of the timber as he removes it. The operator must post a bond to guarantee the complete construction of the roads described in the sales contract. Since the government will be assured of obtaining roads of the estimated value, the operator can be allowed to remove timber without paying any stumpage until the value of the timber removed has become equal to the total estimated road cost. The charge against this road credit should be the volume of each species removed multiplied by the unit bid price for that species. After he has recovered the estimated road cost, the operator will pay for all additional timber at the unit stumpage prices that he bid.

What the Forest Service is really doing is paying the operator in kind for constructing permanent access roads on the national forests. Since the operator is being paid in stumpage rather than in dollars, there is no rational reason for making this payment in the form of a discount or price reduction on the whole lot of timber rather than by a transfer of title to logs of the desired value. The more directly it is done, the easier it will be for everyone to understand and the fewer the controversies that are likely to arise.

OTHER PROBLEMS IN THE APPRAISAL PROCESS

In addition to the key problems just described, the Committee found a large number of other points over which controversies have arisen or which appear to be fruitful areas for efforts to improve the appraisal process. These points are not of uniform significance but the most logical way to present them is in the order in which they occur during the making of an appraisal. Their relative importance will be emphasized as they are covered.

The process by which the Forest Service now appraises national forest timber is extremely complicated. The statement of policies and procedures in the Handbook runs to 108 pages. Even so, certain essential information must be sought in other Handbook sections such as the one on Commercial Sales or in the Forest Service Manual. Temporary directives are also issued from time to time and the individual Regions have prepared supplementary instructions for local use. It soon became evident to the Committee that few purchasers of national forest timber completely understand how this timber has been appraised. The exceptions are association executives and special association committees who have been charged with this duty. In fact, it appears that not even all of the employees of the Forest Service who are involved in it completely understand the appraisal process.

The Committee feels very strongly that the Forest Service should do everything possible to simplify the procedure followed in appraisals. Much of the present complexity has resulted from well-meaning efforts to correct weaknesses or inequities which have showed over the years. It appears to the Committee that the Forest Service has leaned over backward in its efforts to meet the objections of the buyers and to see that they got a fair break on timber sales. Unfortunately, we feel that in the process the Forest Service has often unwittingly laid the basis for other complaints and through the increase in complexity has made it more difficult to achieve complete understanding between the two parties in the sales. In the long run it would be much better to have a simple, understandable procedure and to make changes only in case of proven major inequities. Nothing the Forest Service can do will eliminate all complaints on the part of its timber customers. Dealing with complaints over minor points will always be a part of timber-sale administration. The responsibility for doing this should be placed where it belongs -- on sales administration and not on timber appraisal.

Closely related to the preceding is an evident lack of good communication between the Forest Service and the timber operators. Some of the complaints presented to the Committee were clearly due to misunderstanding on one side or the other. The long-run relationship between the Forest Service and the timber industry is so vital that they must work together in mutual understanding and harmony. A completely satisfactory mechanism for bringing about this close working relationship has not yet been developed.

Internal Consistency of the Appraisal

The appraisal process followed by the Forest Service requires the compilation of many different kinds of information and its combination in such a way as to yield an appraised stumpage price. First, is information on the quantity and quality of the timber to be offered for sale. Second, a location (point of appraisal) must be selected at which the timber can be sufficiently processed to be sold in an open market. Third, are the prices that could be obtained in this market for the kind of products which can be made from the timber. Fourth, are the probable costs of logging, construction of roads and other developments, transportation, and manufacturing up to the point of sale. Fifth, is a reasonable allowance to the operator for profit and to cover the risks inherent in the sale. The value of the stumpage is then indicated by subtracting from the potential sales realization of the products the total cost of converting the standing timber into those products plus an allowance to the operator for profit and risk.

This procedure can only have validity if every item of information which goes into the calculation is consistent with every other item. The volume of the timber must be measured in terms of the products assumed to be made out of it. The hauling costs must be those experienced on the kinds of roads whose construction costs have been used. The overrun relationship used to convert lumber scale to log scale must be that obtainable when sawing for the grade output assumed in calculating the lumber price realization. The point of appraisal must be feasible in terms of assumptions made about road development, hauling cost, and final product out-turn.

All of this appears obvious, but many of the criticisms presented to the Committee had their real basis in a lack of consistency between some of the data used or between some of the assumptions made in particular appraisals. The Committee feels that this is a serious problem as the appraisals are now made and that the Forest Service should place great emphasis on internal consistency. The suggestion to be made later in this report concerning a timber appraisal "team" will offer a practical method of improving consistency.

The following sections will discuss the different parts of the appraisal process. We wish to emphasize that these parts cannot be considered in isolation but must always be thought of in relation to the total appraisal.

Description of the Timber Offered for Sale

In order to offer timber for sale, the Forest Service must designate in some way the specific trees to be removed. This may be done by marking the individual trees or by marking the boundaries of the area and specifying by species, size, and other characteristics the trees to be sold. Since payment for most national forest timber is based on a measurement of the logs actually removed, the Forest Service must also place limitations in the contract on the sizes and qualities of the trees

and logs which the operator may discard in the woods and therefore not pay for.

These specifications must be clearly understood by the appraiser because they control the quantity and quality of the timber being appraised. The Forest Service has a specific policy of not guaranteeing the accuracy of any estimates used in appraising the timber (FSH 2422.1). The potential buyers are warned of this in the advertisement, the prospectus, and the contract. But the reliability and usefulness of the appraised price depend absolutely on the accuracy of the quantity and quality data used as a basis. Many of the complaints presented to the Committee about appraised prices trace back directly to the quantity and quality estimates used in the appraisals.

Cruising

Information on quantity and quality is obtained by inspecting some portion of the trees and recording their species, size, inherent quality, and the proportion of cull. If every tree in the stand cannot be recorded individually, a form of sampling must be used which will give averages representative of the whole area. An accurate estimate of timber volume and quality is difficult to obtain under the best of conditions and exceptionally difficult when subjective judgments must be made about invisible quality characteristics and hidden defects.

Errors in cruising affect the appraisal in many different ways. Errors in the total volume estimate affect the per-unit fixed costs of items such as road construction, slash disposal, and road maintenance which are calculated by spreading the total cost over the estimate volume. Errors in the species composition affect the product realization value because product prices vary greatly from one species to another. Errors in the distribution by tree sizes affect both costs and realization values since per-unit costs vary with size of log and so do grade recovery and over-run. Errors in log grades affect realization values because they produce errors in product out-turn estimates. And errors in the estimates of cull affect the per-unit costs which vary with the amount of sound wood in the logs and also affect the realization values because of the variable effect of cull on grade out-turn.

The Committee feels that an important source of cruising errors is to be found in the inexperienced personnel doing much of the work. Cruising has been an entering or early position for professional foresters in the Forest Service and these men seldom remain very long in this type of work. Forestry schools can teach only the basic principles of cruising; the real skill must be developed through experience. Young foresters recently out of college have not had time to obtain it. Commercial cruisers make this their life work and often have experience in logging and sawmilling before starting to cruise. It would not be surprising if they did a better job than the young government cruisers.

The Committee recommends that the Forest Service assign the work of cruising to specialized personnel who remain in one area and develop local competence in estimating grade and in allowing for defect and breakage. There is no reason why these cruisers need be professional foresters; well-trained and experienced technicians can do a satisfactory job. All government cruisers should be required to visit local mills and logging operations regularly to observe the actual recovery obtained from timber cut on national forest or similar lands. Later in this report the Committee is recommending the establishment of timber appraisal teams and feels that the cruisers should be members of these teams. For the immediate present, the Committee strongly recommends that the Forest Service put into practice more, improved, and tighter check cruising to back up the inexperienced men now doing the field work.

A serious problem in cruising for appraisal lies in grading the standing trees in the forest. This is based on log grades -- a system that separates logs into classes which produce distinctly different proportions of the various grades of the final products when run through the mill. The establishment of a log grading system involves two steps: first, setting up specifications based on clearly-distinguishable characteristics for separating the logs into grades and second, determining the average product realization for each of the log grades when processed through a mill. When the average recovery tables for the different grades are reliable, the problem still remains of identifying the grades of the logs in trees standing in the forest. Interviews with timber operators disclosed a strong feeling that the cruisers were not grading logs in the trees accurately.

The accuracy of the log grading in standing trees can be easily checked by marking trees on a logging chance and having the cruisers estimate the volume and grade by logs of each marked tree. When the trees are felled, the logs can be accurately graded on the ground and compared with the cruiser's estimate. It is not necessary to follow the logs through a mill; whether they cut out what the grade recovery tables say they should is another problem (though admittedly an important one). The immediate question is: how accurately can the log grades now in use be identified in standing trees under forest conditions?

The Committee recommends that the Forest Service make frequent studies to check the accuracy of log grading in the woods. Such checks, by themselves, are a means of improving the accuracy of grading. The Committee also feels that the Forest Service should investigate the possibility of changing the indicators used to identify log grades in order to place more reliance on characteristics that are clearly visible in trees in the forest. Since most national forest timber is sold on the stump, the primary objective of a log grading system should be to separate logs into grades in the standing tree rather than on a log deck or in the log pond.

The Committee also suggests that certain species or diameter classes may lend themselves to whole-tree grading where the range in lumber recovery grades is limited. This type of grading may be based on external characteristics or tree diameter, whichever gives the best results.

The Committee also recommends continuing study of the volume tables used in national forest cruising. Timber varies so much in form that tables which are accurate for one area may give very poor estimates in other areas. The amount and value of the timber being cruised on the national forests certainly justifies the development of empirical volume tables that will fit individual sales areas.

Finally, the Committee wishes to emphasize that careful and accurate cruising is just as important in the appraisal of timber for sale on a log-scale basis as it is in the case of timber sold on a tree-measurement or lump-sum basis. There may have been a tendency in the past to feel that accurate cruising was not really necessary since the government would be paid for the logs actually scaled anyway, and no guarantee had been given to the buyer of the volume being sold.

Marking for selective cutting

In certain timber types there are silvicultural or management reasons for cutting only a part of the standing trees at one time. On such sales, Forest Service personnel must mark the trees to be removed since their selection requires technical knowledge. The appraised value of the timber is then based only on the marked trees.

The Forest Service has made a number of sales on which only a part of the timber was marked in advance with the understanding that the remainder would be marked in a similar pattern. Controversies have arisen over many of these sales; the buyers claiming that the subsequent marking was not what they had been led to believe it would be. In some cases the foresters who did the subsequent marking were not the same ones who had done the advance marking and apparently had different ideas of what should come out. In many cases, marking and cruising were not done by the same people. Since the Forest Service does not guarantee its estimates, the operator is clearly buying a pig in a poke in such sales.

The Committee strongly recommends that every area be completely marked before the timber is offered for sale, and that the volumes be determined simultaneously with the marking. In the exceptional case when this cannot be done, a representative sample area should be marked in advance and this timber should not be cut until all of the tract has been marked. Since the trees marked for selective cutting are frequently over-mature, high-risk, or defective trees the quality of the logs in them is likely to differ significantly from that of other trees in the same stand. The accuracy of the appraisal therefore depends heavily on whether the kinds of trees assumed in making the appraisal are identical with those actually marked.

Marking has an important bearing on appraisal in another respect. The proportion of the trees which are marked and the kinds of trees selected will affect both the costs of logging and processing the timber and the value that can be realized from the products into which it is manufactured. The markers must always remember to mark sufficient timber to make an economically feasible sale. It may be desirable from a

salvage viewpoint to cover a working circle as rapidly as possible, removing only the high-risk trees that probably will die before the next cut. But this should not be done unless a buyer could cover all of his costs and have a satisfactory profit opportunity on the sale as offered. Timber should never be offered for sale which does not appraise out to the minimum stumpage prices with a normal allowance for profit and risk if it is possible to offer a normal profit opportunity by marking more of the available trees.

Merchantability specifications

When preparing a sale, the Forest Service must decide how much of the standing timber is actually merchantable and therefore to be included in the appraisal. In sales where the buyer will pay only for the logs removed and scaled, the contract must specify that he remove all the merchantable timber so the public will receive full value and the operator will not be able to leave the poorest trees and logs in the woods. The Forest Service must decide on the minimum size of tree that should be cut, the minimum top diameter to which logs should be removed, and the proportion of cull which will make a log unmerchantable. Care must be taken in setting these merchantability limits so as not to include sub-marginal logs or trees which will not yield products of sufficient value to cover even the direct costs of their removal. Average specifications for broad areas are not likely to apply under the specific conditions surrounding an individual sale. Merchantability also varies with market conditions and the setting of these limits calls for considerable judgment.

The Committee feels that the Forest Service should check appraisals carefully to make sure that the values assigned to the trees and logs are those which actually can be realized under the conditions of the sale. Individual trees or logs should be valued for specific products only when it is certain that those products can be economically realized from them. This must consider the quantity of material suitable for the particular product, the availability of markets for it, the availability of suitable logging and hauling equipment to handle that kind of product, and similar factors. Unless these factors are favorable, the tree or log may be of the right species, size, and quality but still not be economically merchantable for a particular end use.

Determination of End-Product Realization Values

An examination of the timber appraisal process emphasizes the high degree of interdependence between the various factors involved. The end-product selling value depends on the quality of the product produced, which in turn depends on the grade of the logs or trees processed. It is essential that these relationships be accurately determined on a practical basis to avoid bias in the appraisal.

Woods cruising and scaling

The process of estimating the end-product selling values actually starts in the forest when the field man exercises his judgment as to the log or tree grades which can be recovered. Errors in judgment here will be maintained throughout the appraisal and they must be minimized. The Committee has just made recommendations in this respect, but one additional point must be borne in mind.

Any modification of the present system of identifying the log grades in the standing tree to use revised grading rules which are solely dependent upon characteristics clearly visible in the tree must follow one of two procedures. The standing tree grades must be translated into the log grades now used in conducting mill recovery studies, or new mill studies must be made on the basis of grades clearly identifiable in the tree. The first of these possibilities seems likely to be the more satisfactory.

Equating log or tree grades to lumber grade recovery is one of the most difficult tasks in the appraisal. It is an essential step in translating the log or tree grades in the forest to anticipated end product selling values. The influencing factors include scaling, the amount and effect of cull content, overrun, and sawmill utilization; all of which are interrelated.

Purchasers of national forest timber are normally charged for timber as it is cut, removed, and scaled. The volume is based on the log rule commonly used in the area for the type of wood removed and is so specified in the contract. Since scaling practices vary, even within regions, the appraisal must be made in terms of the scaling practice that will be used when the timber is cut and removed. There is thus a relationship between scaling and appraising. Errors in scaling tend to invalidate the appraisal by upsetting the critical interdependence of its data. Furthermore, they will prove detrimental to either the purchaser or the government and will result in unnecessary controversies over stumpage payment and appraisal data.

The Committee heard considerable criticism of Forest Service scaling practices, primarily directed towards a lack of experienced personnel, carelessness, and inadequate check scaling. As in cruising, proficiency in scaling can be obtained only through experience. The estimation of defect is perhaps the most critical problem and is best learned through observation of logs being sawed in the mill where the nature, extent and influence upon volume of the defects can be noted. Frequent opportunities to make such observations must be offered scaling personnel.

The Committee believes that technicians under the general supervision of professional foresters can be effectively employed in this work. They are less subject to transfer and their experience and knowledge can be retained at the local level over longer periods of time.

Check scaling is a most effective method of maintaining uniformity among scaling personnel and should be reasonably frequent. Since the normal tendency of a regular scaler is to cast aside careless habits when

aware that he is being or is about to be checked, the visits of the check scaler should be unannounced and at irregular intervals.

Grade recovery data

The lumber grade recovery from logs of a particular species will vary with log diameter, grade, and the character and extent of defect. It also varies with elevation, exposure, density of stand, and other characteristics of the site where the tree grew. Two sound logs of similar surface appearance and of the same diameter and length but from different localities, may produce different lumber grade recoveries. To add to the variation in recovery, sawmilling practices in some areas differ from those in others. A mill in an area with a market for chips may dispose of low grade lumber through this outlet while one in another area with no such market may sell low grade material as lumber. This will not only cause differences in the grades of lumber shipped, but also in sawmill overrun. Market demands, selling practices, degree of product refinement, and similar factors produce variations in the ultimate lumber grade recovery. This is the problem the Forest Service faces in its attempt to relate log or tree grades to anticipated lumber grade recovery.

Not all Forest Service timber is appraised as though it ultimately will be manufactured into lumber. Portions of tracts or trees will be appraised as other end products such as plywood, veneer, pulpwood, poles, piling, or logs. The vast majority of the timber will, however, be appraised as lumber and the complaints of industry in this area of the appraisal relate primarily to lumber recovery estimates.

Where a particular species shows a relatively narrow dispersion in the lumber grades produced, the Forest Service has relied on regional or zonal average grade recoveries developed from the records of representative operators who saw that species. On the other hand, when a species develops a wide dispersion of grades of significantly different values, the Forest Service has conducted grade recovery studies at representative mills. The purpose of such studies is to determine the quantity and quality of lumber produced by logs of given diameter and grade classifications. Mill studies of grade recovery are also made upon a regional or zonal basis.

Both the Forest Service and industry recognize that there are inherent weaknesses in these methods of determining the anticipated lumber grade recovery. First, the regional or zonal averages may not apply to local areas for the reasons mentioned above. The Committee therefore recommends that more emphasis be placed on "batch" or "input-output" studies in local areas as a means of modifying regional or zonal studies to fit local conditions.

Second, more information is needed on the influence of defect of varying kinds, proportions, and position in the log on the ultimate lumber grade recovery. Flat deductions for defect in the scaling process, while adequate for stumpage payment, do not truly reflect the

altered nature of the lumber grade output. The Committee recommends further study in this field.

As previously mentioned, lumber-grade output studies are usually based on logs which are carefully graded on the mill deck. In actual practice, timber is appraised on the basis of log grades observed in the standing tree with all of the attendant opportunities for misjudgment. The Committee suggests that the Forest Service attempt to correlate the grading of logs in standing trees more closely with standard mill-deck grading, either through additional training of cruisers or through a modification of grades.

Sawmill overrun or underrun, or the difference between the net log scale quantity and the ultimate quantity of lumber recovered on a shipping tally basis, are normally determined by the Forest Service through the use of mill recovery study data. The use of such data has been the subject of strong criticism from industry on the grounds that their experience is not in keeping with the Forest Service data. Industry suggests that such differences arise from local conditions that are not consistent with the regional or zonal studies and that such studies have been made under "clinical" conditions that result in "tight" scaling and optimum lumber recovery which is not normal in usual day-to-day operations.

Overruns tend to vary significantly with scaling accuracy, log lengths, log taper, sawmill practices and efficiency, products produced, degree of utilization, refinement of manufacture and other factors. Two mills cutting similar logs would therefore be unlikely to experience the same overrun. This is something over which the Forest Service has no control beyond the point of scaling.

The overrun or underrun factor is of real significance in an appraisal since it is the means of converting anticipated end-product selling values and sawmill manufacturing costs from a lumber-tally basis to a log-scale basis. Since Forest Service appraisals are directed toward an operator of average efficiency, they must remain within this framework throughout the entire process, including the anticipated lumber grade recovery and sawmill overrun. Any deviation will tend to bias the appraisal.

The Committee has some recommendations for strengthening the Forest Service information on overrun. "Batch" or "input-output" studies made in local areas, as recommended earlier, will provide needed information on lumber grade recovery and also sound checks on actual overrun. Since overrun is intimately related to lumber output, normal sawing practices for the area should be used. When logs are sawed for maximum grade recovery, the overrun will usually be less than when the same logs are cut for maximum quantity of output. Therefore, the overrun factor must be consistent with the objective of sawing.

Overrun factors must be based only on that portion of the lumber output that it is economically possible to carry through to the selling point. This, again, is intimately associated with lumber grade recovery.

In areas where the average mill has chipping facilities and ordinarily processes low grade material into chips rather than lumber, this must be reflected in the lumber grade recovery and also in the overrun. In those areas, such low grade material should be valued separately as chips and not as lumber, and should not be included in sawmill overrun. The volume of such material can be accounted for as units of chips per thousand board feet (log scale) put through the sawmill.

Finally, log scaling for lumber grade recovery studies must be performed in accordance with normal scaling practices. Any tendency to make more exacting deductions for defect in such studies will introduce a constant bias in the scale and result in overruns.

Studies involving lumber grade recovery or overrun will necessarily demand the full cooperation and assistance of industry. A lack of understanding and cooperation between the Forest Service and industry will doom such studies to failure before they start. Industry must be cognizant of the problems faced by the Forest Service in recovery studies and their advice and counsel should be sought in establishing objectives, procedures, methods of compilation, and application of the results. To have industry object to the results of a costly mill study because of an initial premise disagreement that did not arise until the study was complete appears to be the fruit of shortsightedness. On the other hand, when there is complete agreement on the entire procedure, both industry and the Forest Service should be willing to abide by the results.

Determination of end product selling prices

The end product selling values used in a Forest Service appraisal are based on the product of highest value at the earliest stage of processing where timber quality can be reflected, where a free market price for that product can be determined, and where the specific cost of producing that product can be segregated from other costs. (FSH 2423.41) The stage of processing to which the product is carried in determining the selling price for the appraisal therefore depends largely on local conditions. Where free markets exist for round wood of various grades, the Committee urges the Forest Service to use these markets to determine the end product selling prices. Carrying the product to a further stage can lead to complicated study and endless controversy with perhaps little difference in the final appraised stumpage value.

Since the inherent characteristics of wood product markets vary from place to place, the selling prices used in the appraisal should be localized as much as possible. Regional and even zonal averages often do not properly reflect local prices. This is particularly true with some minor species whose local selling prices diverge significantly in one direction or the other from the regional or zonal averages.

Local fluctuations in selling prices are best obtained from representative operations in the same area. The Forest Service should aggressively continue its efforts to localize industry-experienced selling prices in order to minimize the possible bias introduced by using

prices collected over a large area. The Committee concludes that the Forest Service is making progress in this direction but believes that added effort would materially strengthen the appraisals.

Since appraisals are generally related to a specific date or base period, the end-product selling values must be estimated as of that date or period. This is termed "current pricing". Industry-experienced prices for the most recent calendar quarter are adjusted to the base date or period with the aid of selling price indices. The Forest Service is presently using this method of current pricing and the Committee believes that the principle is entirely satisfactory. Subjective pricing or future price prediction is defenseless against well-founded criticism and should be avoided.

Forest Service appraisals treat cash discounts and commissions as a reduction in the gross estimated selling values. Since it is standard industry practice to selling lumber and wood products on the basis of "net price", that is, after discounts and commissions, the present Forest Service procedure appears perfectly logical to the Committee. The Committee also feels that any income or costs attributable to underweights or overweights should be credited or charged to lumber selling values on a shipping tally basis.

When the average operator in a local area manufactures by-products such as chips, this must be reflected in the appraisal, with due recognition of the influence of the by-product on the ultimate end-product grade recovery, selling values, overrun, costs, and other interdependent items. The Handbook states that "when earnings and costs from by-product manufacturing are included in the appraisal, the by-product earning 'log-scale' should be added." (FSH 2423.44) This is understood to mean that the net value, i.e. selling value less cost of manufacturing, is added to the species selling value and that costs are not reflected elsewhere in the appraisal. In keeping with the general recommendation made elsewhere in this report, selling values and costs should retain their identities in the appraisal and should not be netted into a single figure.

Determination of Costs

In its appraisal process the Forest Service considers the costs required to obtain the selling values used in the same appraisal. These include all the necessary expenditures which would be incurred by an operator of average efficiency. (FSH 2423.26) In determining selling value, the Forest Service attempts to obtain prices that are in general use by the industry of an area and which have developed in a free market. (FSH 2423.25) The selling values, therefore, also represent those which an operator of average efficiency could realize. It is not usually possible to obtain both costs and selling prices from a common sample of operators and this can cause problems of comparability in the use of these data. More serious problems arise, however, in obtaining costs representative of the hypothetical operator of average efficiency. These will be discussed under the different broad classes of costs.

Manufacturing costs

The Committee received practically no complaints about the costs used for the manufacture of lumber and veneer from logs. Apparently the methods followed by the Forest Service in obtaining such costs and the use made of them in the appraisal process are satisfactory.

A number of questions were raised, however, about the procedure when chips are included in the appraisal as a by-product of a sawmill. There will be less confusion if the revenue from the sale of chips is included with other realization values and the costs of making and handling the chips are included with other manufacturing costs. The additional costs which result from handling chips must include depreciation on the chippers, debarkers, conveyors, and other machines added to the plant specifically because of the chip production.

Logging costs

Many operators told the Committee that the costs used in the appraisals were not good estimates of those that actually would be incurred on the timber sales. There appear to be three possible reasons for this. First, the zone average costs now commonly used are too broad to reflect the local differences that exist in logging conditions. Second, even though the cost data issued by the Regional Offices give ranges of costs for specific operations, the local appraisal officer tends to use the average rather than his own judgment. Third, the Forest Service includes in its averages the costs of firms who obtain only part or even none of their timber from national forest sales.

The Committee recommends that the Forest Service make more strenuous efforts to obtain and use costs which allow fully for log size, terrain, and other local conditions. If this can best be done by starting with zone average figures and adjusting them to fit local conditions, measures must be taken to assure that the local adjustments are made and that this is done in a realistic manner. The suggestion later in this report for the establishment of timber appraisal teams in the Supervisors' offices would facilitate these local adjustments.

The Committee also feels that the costs used in appraisals should be based on those experienced by operators cutting on national forest sales. The Forest Service timber sale contract imposes many restrictions and responsibilities on the buyer which he would not encounter in cutting timber on his own or other privately-owned lands. We have no question that these requirements in the contract are in the public interest, but we are sure that they affect the cost of logging on the national forests and feel that this should be recognized in the costs used in the appraisals.

The point of appraisal

Transportation is an important item in the total cost of getting timber from the forest to a free market. This cost varies with the stage in processing which has been reached, such as logs, green lumber, or dry lumber. The selling values for the appraisal are determined at the shipping point where the product enters a free market. This is usually at railhead and may or may not be at the plant. In appraising a particular tract of timber, therefore, a decision must be made as to the point at which it is to be assumed that the timber will be processed. The Forest Service specifies that this is to be the most advantageous location, which ordinarily will be the one with the cheapest total transportation cost to railhead or equivalent. (FSH 2423.23)

Although a number of controversies have arisen over the points of appraisal that have been used, the general procedure followed by the Forest Service appears to be acceptable. The Committee wishes to make two recommendations, both of which would represent a tightening up of present practice rather than an actual change in procedure.

Wherever there are existing plants which are potential purchasers of national forest timber and that are within economic reach of the sale area, the point of appraisal should be at the nearest of these plants that has facilities to handle the kind of timber for sale and never at a hypothetical plant location. When no plants exist within economic reach, the point of appraisal should be at the most probable location for the establishment of a new plant. If the nearest existing plant has some other permanent source of logs and is not a potential purchaser of national forest timber, it should not be used as the point of appraisal unless it is the only existing plant and any new plant would most likely be built at that same location.

When a sale includes different kinds of timber which would be most economically processed into different products by different kinds of mills (for example: sawlogs and veneer logs or hardwood sawlogs and pine sawlogs), each kind of timber should be appraised to the nearest mill capable of processing it. When there is only a small quantity of one kind of timber in the sale, a careful analysis must be made of whether it could be taken economically to the nearest specialized mill or might for practical reasons have to be handled by a nearer mill which would make it into a lower value product. For example, it may not be feasible to take a small quantity of sawlogs from an otherwise pulpwood sale to the nearest sawmill. They may inevitably have to be made into pulpwood and they should be appraised on this basis.

Road costs

Earlier in this report, the Committee analyzed the relationship between access road construction and timber appraisal on the national forests and recommended a major change in the method of handling the road construction costs. Regardless of whether that recommended change is made, there are two other sources of complaint about road costs that must be considered.

Many operators have complained that the Forest Service was requiring them to build access roads to higher standards than would be necessary for timber removal. As we pointed out before, the Forest Service has been using timber sales deliberately as a means of financing the construction of a permanent road system. Since the Secretary of Agriculture was specifically directed by the Congress in the Act of June 12, 1960, to "develop and administer the renewable surface resources of the national forests for multiple use and sustained yield of the several products and services obtained therefrom", the national forest access road system must be built for multiple use and not just for timber management. It is, therefore, reasonable for the Forest Service to design its road system for long-run multiple use at the time it is first built. This could have a deleterious effect on the buyers of national forest timber in two ways. If the amortization provisions in the timber sale contract are not adequate to make sure that the operator will recover all the estimated road construction costs, part of the cost of building a national forest road system will be borne personally by the timber buyers. Second, if the higher road standards require the operator to tie up capital in road construction which he could use more profitably for other purposes, the net effect of requiring these higher standards is to reduce the operator's total profits.

The Forest Service understands all of the above and has taken a number of steps to deal with it. Through the provisions for "accelerated amortization" and "rapid accelerated amortization" the Service has attempted to assure the buyer an opportunity to recover the estimated road costs. In addition, Section 2431.24 (subsections 5, 6, and 7) of the Handbook gives detailed instructions concerning road standards. Forest development roads are divided into two classes: those that will be needed continually for national forest traffic after the sale is closed and those that will be needed only intermittently. For these intermittent roads, the standards desired by the Forest Service are equivalent to those that would be used by a prudent operator for timber removal. They should not cause problems.

Regarding the roads that will be needed continually, the Handbook says: "design standard which will have maximum residual value to the Government may be specified, provided the estimated cost of transportation (facility costs plus user costs . .) under such standards does not exceed the estimated cost a prudent purchaser would incur for transportation of the timber in the sale." Then the Handbook says that an economic analysis must be made to determine two costs -- those of a road built to the standards desired by the Government and those of a road built to prudent operator standards. If there is a significant difference between these costs, the Handbook suggests four possible procedures. The most obvious is for the Forest Service to construct the road with appropriated funds. The second is to "Plan for cooperative construction to design standards required for national forest traffic and pay the additional cost from appropriated funds." This appears to be the most common procedure.

Regarding the second procedure -- cooperative construction -- the Handbook says: "A purchaser cannot be required to cooperate in construction of roads or bridges to standards above those which may properly be

specified in the sale contract." Taken literally, Section 2431.24 of the Handbook says that the only access-road construction costs which can be entered in the timber appraisal are those that a prudent operator would spend to build the main roads needed to log the timber unless the buyer agrees to build the roads to a higher standard on a cooperative basis with the Forest Service reimbursing him for all of the additional costs that result.

The Committee feels that the procedure outlined in this section of the Handbook is reasonable and adequately protects the buyers. However, the existence of so much complaint over road construction requirements leads the Committee to question whether the procedure as spelled out in the Handbook is being strictly adhered to on all timber sales. We strongly recommend that the Forest Service take all necessary steps to assure that its timber management officers do follow specifically and in detail the instructions in Section 2431.24 of the Forest Service Handbook.

The opposite problem from that of too high standards has also sometimes arisen. In deciding on the standards for a road, a prudent operator will consider not only the cost of building the road but also the costs of getting timber out over it and maintaining the road under use. He will, therefore, usually build something better than the minimum road over which logs can be moved. In cases where a timber sale is a marginal proposition anyway, the specifications for road construction have sometimes been reduced below what a prudent operator would build in order to make the sale appraise out with a normal margin for profit and risk and minimum stumpage prices. If in such a case the buyer is forced to build a better road than that allowed for in the appraisal in order to keep his total transportation costs down, the margin for profit shown in the appraisal calculation had no real validity.

The Committee received a large number of complaints about the reliability of the road-construction costs used in the appraisals. Road construction makes up such a large part of the total cost on many national forest sales that it has a major influence on the accuracy of appraisals. The estimates of quantity and quality (such as the nature of the material to be removed in cuts) apparently are less accurate than the unit monetary costs applied to them. Improvement of the accuracy of road cost estimates should have a high priority in Forest Service appraisal work. The proposed post-construction surveys of actual work done would serve to correct errors in the quantity and quality estimates on the roads surveyed and would also provide valuable experience for improving future estimates. The Committee recommends that the Forest Service also continue its efforts to improve the reliability of its road cost estimates by all other means available to it.

Apportionment of the Conversion Return

The conversion return, or amount remaining after deducting the estimated costs (excluding stumpage) from the estimated selling values, consists of two parts: (1) the margin for profit and risk to be allowed the operator and (2) the appraised stumpage value. Being a residual,

stumpage is that portion which remains after deducting the margin for profit and risk from the conversion return. The profit and risk margin must therefore be established as the initial step.

This margin includes the elements of profit to the operator, interest on borrowed capital, and an allowance for income taxes. Thus, it actually represents an allowance for profit before incomes taxes. As its name implies, it consists of two basic parts: (1) an average return to the operator for his services and for the use of the capital needed in the business sufficient to maintain an operation of average efficiency over the long term, and (2) an additional allowance to compensate for the risks that may cause the realized return to be lower than normal. The purpose of the risk allowance is to assure operators of average efficiency an opportunity to average the profit provided in Forest Service appraisals over the long run. This is not, nor should it be, a guarantee of profit. Rather, it provides a reasonable opportunity for profit in the long term, fully recognizing that profits may vary significantly from year to year.

In calculating the margin for profit and risk in an appraisal, the Forest Service uses the profit ratio which expresses the margin as a percentage of the total costs including stumpage. Since stumpage at this point is an unknown, profit ratios are algebraically converted to selling value ratios for direct application. However, for simplicity and clarity, it is preferable to discuss the margin for profit and risk in terms of the profit ratio.

The determination of fully justified and proper ratios for profit and risk is a difficult task and it has been the subject of serious controversy between timber operators and the Forest Service because of its influence on the possible profit opportunity.

The Forest Service adjusts the profit ratios on the basis of judgment from time to time to keep abreast of market conditions. This has been broadly criticized as one of the factors contributing to instability in the dependent industry. Possible solutions which have been suggested by industry include the following:

1. Strengthening the basic appraisal data sufficiently so that the profit ratios now used can actually be realized on sales acquired at the appraised price.
2. A blanket increase in the profit ratios used in appraisals to overcome present appraisal deficiencies.
3. Basing the profit ratio upon the profit experience of competing industries after making proper allowance for the difference in risks involved.

In view of industry's complaints of the purported inadequacy of the profit ratios used by the Forest Service, the Committee feels that this ratio will be better understood and used if it is separated into its two component parts -- profit and risk -- and so indicated in the appraisal.

The margin for profit must provide the operation of average efficiency with sufficient profit to maintain economic stability, to perform necessary research and development, and to be attractive to equity capital. The ratio which is found adequate for this purpose should be used in all timber appraisals and should not vary with either geographical location or time. The Committee feels that a thorough economic study of profits should be made by a competent authority, but suggests in the meantime that the Forest Service use a profit ratio in the vicinity of 10 percent. This would allow a profit ratio after taxes that would be generally consistent with that historically realized by the manufacturing industry as a whole.

The margin for risk should vary with the risks inherent in the specific timber sale being appraised. The Committee suggests that the risk ratio should normally be within the range from 0 percent to 5 percent. Among the risk items to be recognized in selecting a risk ratio are the following:

1. The relative stability of the market for products from the various species included in the sale. This refers specifically to price stability and not to price trends.
2. Inherent conditions on the particular logging chance which might cause unpredictable and wide variations between estimated and actual logging and development costs. Under no circumstances should the risk ratio be employed to compensate for errors in the appraisal. Such errors should be corrected independently of the risk ratio.
3. The probability of hidden defect in the timber and of abnormal breakage.
4. The length of the sale period.
5. The amount of salvage in the sale with its attendant risk of degrade before removal.

No attempt should be made to adjust the risk ratio in anticipation of possible future changes in the price levels of the end product. Predictions of future market conditions, even when made by outstanding economists and professional forecasters, are notorious for their failure to prove correct in more than a minority of cases. The use of a system of escalation of stumpage prices in accordance with changes in the end product prices actually experienced after the signing of the timber sale contract will satisfactorily overcome much of the risk of future changes for both parties to the contract. Any other attempts by the Forest Service to anticipate future trends would probably increase rather than reduce the risk from the purchaser's viewpoint.

It is the Committee's opinion that the controversy concerning an adequate profit ratio can be largely resolved through the application of diligence in the other areas of the appraisal process. In actual fact, once a sale has been purchased and the stumpage price has been established by bid, the profit, rather than the stumpage, becomes the residual. Any

errors in selling value or cost are then reflected in the operator's ultimate profit instead of in the stumpage price. While we recognize that the Forest Service cannot guarantee the data it uses, it must assume the responsibility of offering a real profit opportunity in its appraisals.

The Committee has suggested a stable profit ratio of about 10 percent and a risk ratio ranging from 0 to 5 percent. This suggested profit ratio was based on a rather cursory examination of profits for all manufacturing over a long period of years. The historical figures are, of course, net profit after all risk. We reason that if the manufacturing industry as a whole can, with a realized profit ratio in the neighborhood of 10 percent before taxes, prosper, attract equity capital and meet competition, the operator of average efficiency in the timber industry should be capable of performing equally well over the long run.

The Committee is not convinced that it would be prudent to attempt to base the profit ratio for Forest Service appraisals on the experience of a competing industry. This lack of conviction stems in part from the fact that the use of such a method upon a year to year basis would prove unwieldy to administer, that fluctuations in earnings between competing industries may or may not move in unison and at constant rates, and that such a procedure may result in charges of subsidy.

We believe that the entire subject of profit and risk ratios warrants further study. The Committee recommends that the Forest Service initiate a thorough economic study of this subject through a competent economic research organization and not as an administrative study by timber management personnel.

The residual which remains after deducting the margin for profit and risk from the conversion return is the indicated stumpage value. This computation is made for each of the several species in the timber sale. In the event that this residual turns out to be less than the minimum price for a species, the Committee recommends that a sufficient portion of the costs charged against that species be transferred and distributed proportionately to those species with indicated stumpage values in excess of their respective minimums. This method, known as the "sale-as-a-whole" concept, will bring all appraised stumpage values up to the minimum with the higher valued species "carrying" the species that have indicated values less than the minimum. In no case, however, should this adjustment be made by a reduction in the margin for profit and risk, which must be retained at the normal level for each species.

The adjusted appraised prices obtained by the foregoing procedure multiplied by the estimated volumes of the individual species on the sale area will give the total appraised timber value for the tract on the sale-as-a-whole basis with access roads in place.

In the event of the adoption of the suggestion made earlier in this report that road costs be amortized by allowing them as a credit against the stumpage liability resulting from cutting and removal, the stumpage value to be advertised would be the appraised value. In

addition, the sales prospectus, advertisement and the contract must clearly state that a road credit in a stated number of total dollars will be granted the successful bidder and that charges against his credit will be computed at the bid unit rates by species times the volume cut by species, until such time as the road credit is fully absorbed. When this credit has been absorbed, stumpage payments will be the species bid rate times the species volume removed.

Sales Which Appraise out Below the Minimum Prices on a Sale-as-a-whole

Basis

On some prospective timber sales the present appraisal process shows a conversion return that is not sufficient to cover both the minimum stumpage price and a normal profit margin. In the past, some of these sales have been offered at the minimum prices and with the less-than-normal profit margin. A provision has been included in the contract that the buyer will be credited with a "road amortization rate deficit" for each unit of logs removed and that he will then be allowed credit for this amount against any upward escalation in stumpage price which may be made during the lifetime of the sale. This, of course, is no guarantee that he will ever make up the deficit.

The Committee feels that any timber sale which will not bear the full costs of timber removal, return the minimum stumpage demanded by the Forest Service, and give the buyer a full normal profit margin is not an economic offering at the minimum stumpage prices. Before such a sale is offered, the Forest Service should exhaust every possibility of making it economic by adding to the area; increasing the proportion of the stand marked; redesigning the roads; assuming itself such non-logging costs as slash disposal, snag falling, and fire protection rather than charging them to the operator; and other such means. If even after all this the sale still will not produce a normal profit margin, it should be considered a sub-marginal block of timber and not offered for sale. The allowable cut should be achieved by preparing some other block for sale.

In the event that no timber in the working circle will appraise out with a normal profit margin, but a dependent local operator requests a timber sale, the best possible area should be offered with a "profit deficit allowance" in the contract. This deficit is really no more due to road construction than it is to other costs, product realization values, or for that matter stumpage (which is arbitrarily entered at the minimum prices). Adjusting for this deficit by juggling the road amortization allowances is confusing and serves no useful purpose. The buyer should not pay any increase in stumpage price which may result from escalation above the minimum until he has made up this profit deficit. If he has a chance to absorb the full deficit in this way, he should thereafter pay for additional stumpage at the bid price plus upward escalation figured in the customary manner. Timber should be offered for sale with a deficit allowance only as a last-resort means of maintaining a dependent firm or community.

Adjustment of Stumpage Prices to Conform to Changes in Product Market

Prices During the Timber Sale Contract Period

The prices of wood products fluctuate over any period of time. Most timber sales last at least several years from the time the contract is signed until the last timber is removed. The prices of the final products can, therefore, be much higher or lower at the time the timber is cut than they were when the appraisal was made. The government would then be receiving too little for its timber if prices have risen or the buyer may be paying too much for it if prices have fallen. To protect against this, many sale contracts contain an escalation clause. Escalation is based on the changes that take place in a price index, such as the Western Pine Index. The value of this index at the time of the sale is entered in the contract as the "base index." The price bid for the stumpage is then adjusted quarterly by one-half of the difference between the index in that quarter and the base index. This means that half of any change is absorbed by the government and half by the buyer. This equal division of the change between the two parties seems reasonable to the Committee and we do not see any immediate justification for using some other proportion.

The Forest Service has established minimum prices below which it will not sell stumpage regardless of how the appraisal works out. It also uses the concept of a base rate ("basic appraised value") below which adjustments in price will not be made. Until recently this base rate was set rather arbitrarily at some level above the minimum price. At present, the policy is to make the base rate the same as the minimum price, but this policy is subject to change. The base rate (or minimum price) sets a floor below which the stumpage prices cannot be reduced by escalation, no matter how low the final product prices fall. When timber is sold at the minimum price, the government can benefit from a product price rise through upward escalation but the buyer cannot get any redress for a price fall because the price cannot escalate downward. This same thing can happen in varying degree when the sale price is near the minimum.

The Forest Service has recognized the inequity of the use of base rates in the escalation arrangement. During any quarter in which the stumpage price after adjustment for escalation is below the base rate, the amount by which the total price of the timber removed in that quarter would have been reduced if it had not been for the base rates is recorded as a credit to the operator. If in subsequent quarters, the price rises above the base rate, the buyer does not pay any more than the base rates until he has accumulated a total offset equal to the amount that had accumulated to his credit during the time that the adjusted prices were below the base rates. Even under this complicated arrangement, the buyer can break even only if prices do eventually go above the base rate for a long enough time to let him make up the accumulated deficit. If prices drop below the base rate during the latter part of a contract period or drop below the base rate and then never go above it again during the sale period, the buyer cannot receive the full benefit of downward escalation, and may not receive any benefit at all.

The "basic appraised value" described in section 2423.85 of the Handbook does not appear to the Committee to be an economically rational concept. Its only justifiable function seems to be to make certain that the adjustment of stumpage prices in accordance with changes in product prices could never lead to negative stumpage prices. This protection is provided by the minimum prices set forth in FSH 2430.71. The Committee feels that the concept of a "basic appraised value" should be abandoned completely and that if this is not possible it should be so defined as to always be synonymous with "minimum price."

The Committee recommends that the Forest Service explore the possibility of changing the present escalation method to provide that upward-escalation from the bid price be limited to an amount equal to the possible downward adjustment set by the minimum prices. Under this procedure there would be no escalation at all on sales made at the minimum prices. The "accumulated differences" or deficits resulting from downward adjustments extending below the minimum prices (FSH 2434.32) would be abolished. The Committee feels that this changed procedure would (1) provide greater equity than the present procedure by giving both buyer and seller an equal chance of benefiting from stumpage price adjustments and (2) make the procedure less complex and cheaper to administer.

Rate Redetermination

The Committee feels that sales with provision for rate redetermination should be kept to a minimum. Where rate redeterminations are made, the Committee recommends that the amount by which the winning bid exceeded the original advertised price (the bid premium) be added to the new appraisal price produced in the rate redetermination appraisal.

The Committee believes that if the other recommendations in this report concerning the original appraisal are also adopted in subsequent reappraisals, the procedure as described in Section 2423.8 of the Handbook will be entirely satisfactory for making rate redeterminations.

TIMBER APPRAISAL PERSONNEL

Discussions and observations in all parts of the country led the Committee to realize that a significant part of the problem of satisfactorily appraising national forest timber lies not in the appraisal procedure itself but with the people who carry it out. The timber industry recognizes the magnitude of the national forest timber sale program and appreciates the problems which the Forest Service has faced in expanding this program so rapidly in recent years. We found an amazing lack of criticism of individual forest officers and a general attitude among the operators that on the whole the Forest Service is doing a good job. At the same time, it was apparent that some of the objections expressed by the operators stemmed from the competence of the personnel engaged in the appraisal work.

There appears to be considerable variation in the application of procedures from one national forest to another and even between ranger districts in the same forest. The differences between Regions are large in some respects. This is understandable in view of the general Forest Service policy of delegating responsibility to those nearest the scene of action. However, these variations are confusing to the timber operators and in some cases, usually through misunderstanding, have led to charges of unequal treatment. It appears that further standardization would be desirable in things that do not really need to vary with locality and that somewhat closer supervision of the junior officers is needed.

A lack of experience is common among the men collecting much of the basic data. Cruising and marking are not simple activities when they involve quality determination and allowance for substantial but hidden defect. These skills cannot really be taught in the forestry schools and the transfer policy of the Forest Service does not keep men in such work long enough to learn from experience. The same is generally true of the estimation of logging and road construction costs. The operators were especially critical of the fact that Forest Service officers engaged in appraisal work spend so little time on logging jobs and in mills where they could observe how the timber they had cruised or marked actually cut out. The older and experienced men assigned to timber appraisal work apparently are often tied to their offices by administrative duties and have little time to engage in or supervise the field activities.

A feasible solution to these personnel-based problems lies in the establishment of timber appraisal staff units in the Forest Supervisor's offices. These staff units should be organized as teams and made up of people having the various specializations necessary for the appraisal undertaking. The staff unit in a Supervisor's office would be responsible for all appraisals on that forest. The planning of the areas to be cut, the conduct of the sale itself, and the subsequent administration of it would continue to be the responsibility of the regular line organization. The appraisal unit would work closely with the timber management assistants in order to use their knowledge of local conditions and to make sure that the appraisal was consistent with management plans and sale administration. Marking of timber for cutting and road layout and specification probably should be planned jointly by the appraisal unit and the timber management and engineering staffs. The appraisal unit should, however, have an important position in decisions regarding marking and roads since these have such a significant effect on timber values.

The timber appraisal unit should be responsible for determining the quantity and quality of the timber to be sold (through cruising or other means); the logging and road construction costs to be used; the point of appraisal; the product realization values to be used; and the allowance to be made for risk. Since they would work on this as a team, they could coordinate their efforts and make sure that the appraisal was internally consistent. In the case of marginal sale areas, the appraisal unit would be responsible for making the necessary adjustments to produce an economic sale.

In view of its importance in the overall program of the national forests and of the very large monetary values involved, timber appraisal should be considered a career opportunity in the Forest Service. Men should be assigned to the appraisal function on a reasonably permanent basis. Turnover in the entering positions will be inevitable, but as men are found with aptitude for and interest in appraisal work they should be kept on it. The appraisal team should always, therefore, be made up largely of experienced men who would carry out the most important functions and also guide and train new men as they come in. The man in charge of each team should have considerable experience in all aspects of the appraisal process and should be competent to make the judgments which are inevitable in appraisal work. The grades and salaries for the appraisal positions should be adequate to hold qualified men and there should be opportunities for eventual advancement within the units and to wider responsibilities in the Regional and Washington offices.

It probably would be desirable for timber appraisal staff people to be given occasional assignments in timber management or national forest administration in order to broaden their experience. However, the appraisal work is sufficiently important to take precedence over most other activities, and members of the appraisal teams should not be drafted for other work except in the case of severe fire emergencies. The "instability" of which the buyers of national forest timber complain so strongly can only be overcome by developing and maintaining a stable staff of competent timber appraisal experts.

SUMMARY

The appraisal of publicly-owned timber to be sold from the national forests is a complex problem. The Forest Service is by far the largest timber grower in the United States. Its operations are concentrated in the West but it controls land and sells timber in all parts of the country. The national forests contain a great variety of species, sizes, and qualities of timber which pass through many different markets and ultimately are manufactured into a multitude of products. What the Forest Service does with this timber has a pronounced influence on the entire wood-based economy of the country.

But the Forest Service has a broader role than mere custodian of the national forests. It is the federal agency charged with promoting the development of all forest resources in the United States for the benefit of all the people. The sale of timber from the national forests must, therefore, always be considered in the perspective of the whole forest economy. Public timber cannot be appraised as though its sale would not influence the general market for wood. Appraisal goals and techniques that are suitable for an individual selling a small amount of timber are not necessarily sound for appraising this public timber.

The situation is further complicated by the fact that the Forest Service just grows the timber; its harvesting and processing are done by private enterprise. An adequate and efficient wood-using industry must therefore be maintained if growing timber on the national forests is to benefit the country. The appraisal of public timber must recognize

clearly this close mutual interdependence between the national forests and the timber industry.

The Committee has thoroughly reviewed the appraisal of timber on the national forests in the light of the above conditions and is convinced that the major problems and best opportunities for improvement lie in the following areas which we have discussed at length in the body of this report:

1. There is no clear statement of policy by the Forest Service regarding its objectives in selling timber from the national forests. Appraisals can be made for a variety of purposes and the results will vary with the objectives of the sellers.

2. The price which the Forest Service is seeking in its appraisals needs to be defined more clearly. "Market value" is too vague to be useful in view of the kind of market in which national forest timber is sold. The Committee suggests an "acceptable price" as a more reasonable appraisal goal. The Forest Service should depend on competition among the buyers to determine the selling price (as it now does). The appraisal should seek to determine only a minimum or upset price.

3. National forest timber appraisals must provide an opportunity for the buyer of average efficiency to make the profit necessary for long-time operation. The full normal profit allowance should be present in every appraisal.

4. The costs of constructing permanent access roads should be segregated from the rest of the appraisal. The cost of such permanent roads should be borne by the public. Under the present appraisal procedures it is possible for part of this cost to fall entirely on the timber buyer if the amortization computations are in error or if the timber is sold with a road amortization deficit.

5. The basic data now being used to determine the sales realization values, costs, and risk allowance for timber appraisals are not all sufficiently accurate and sometimes are not consistent with each other. Efforts to improve these data should be continued and intensified.

6. Part of the problems which develop in national forest appraisals have their origin in the personnel engaged in the work. Teams of specialists assigned permanently to making appraisals would avoid many of the errors which now result from a lack of experience or competence.

The Committee feels that the Forest Service has done a remarkable overall job of administering timber sales during the post-war years when the volume sold from the national forests has been increasing at such a rapid rate. It would be amazing if procedures developed under the earlier limited sales program had not proved inadequate and if mistakes had not been made in trying to adjust them to changed conditions. We are convinced that the Forest Service has tried very hard to be fair to the buyers of its timber and to remedy any just complaint. We do believe, however, that there may not have been a sufficient appreciation on both

sides of the vital interdependence that exists between the national forests and the timber industry. In the tradition of American business, the buyers of national forest timber may be expected to take every possible advantage in their dealings with the government. The Forest Service must therefore always be alert to defend the interests of the public in its timber. But at the same time it must never forget that the public also has an interest in maintaining an efficient wood-processing industry. The Service will be in the strongest possible position to carry out its duty if it is scrupulous in assuring an adequate profit opportunity for the buyer in every timber appraisal.





